

## HYBRID ATTENTION-BASED DENSENET-TRANSFORMER MODEL (HADNET) FOR AUTOMATED BONE CANCER DETECTION

### Abstract:

Osteosarcoma, a rare and aggressive bone cancer, requires precise and early detection for effective treatment. This study introduces the Hybrid Attention-Based DenseNet-Transformer Model (HADNet), a novel deep learning algorithm for bone cancer detection. The model integrates DenseNet for efficient feature extraction, Attention Mechanisms to focus on critical tumor regions, and Transformer Networks to capture long-range spatial dependencies in medical images. HADNet improves the detection of both subtle and prominent anomalies in bone structures, enhancing the ability to identify osteosarcoma. The attention mechanism ensures that the model prioritizes suspicious regions, while the transformer layers provide contextual understanding across the entire image. Preliminary results demonstrate that HADNet outperforms traditional deep learning methods in terms of accuracy and precision. This hybrid model not only enhances diagnostic accuracy but also offers interpretability, making it suitable for clinical environments. The proposed model represents a promising tool for early, non-invasive bone cancer diagnosis, improving patient outcomes through personalized treatment strategies. HADNet's integration of these advanced technologies has the potential to revolutionize bone cancer detection.



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